APPENDIX A

TYPES OF CASE STUDIES

Case studies have been recognized as an excellent method to involve the trainee in the learning process. One problem facing the instructional developer is selecting the right type of case study to deliver that learning. There have been many books and magazine articles written on what is the "best type" of case study. In reality, there is no one best type. The following list of case study types have been selected from the dozens that are available to the instructional developer. Along with each type of case study given, suggestions for use with objective classifications (i.e., higher order objectives) have been given, as well as a description and suggested use for the case study.

Case Study Type: BACKGROUND	Objective Classifications: DEVELOPMENT
Description and suggested uses: The primary purpose of the background case study is to impart information, to supply factual data, or to familiarize the trainee with the wider circumstances of a specific situation. It can be presented as a motivator to a lesson or within the body of a lesson to illustrate a point. The instructor provides a brief description of the case then asks the trainees questions. After the lesson presentation, a handout giving the facts of the case, the lessons learned, facility specific actions, and questions asked by the instructor can be distributed to reinforce the material. The advantage of doing this through the medium of a case study, rather than by means of reading, is that the trainee absorbs the data more easily. It relates to a real situation. It also has advantages for the older trainee, who needs to acquire the data but might not be prepared to admit their ignorance if it were presented more formally.	

Case Study Type: COMPLEX	Objective Classifications: DIAGNOSIS, EVALUATION
Description and suggested uses: The complex case study is a variation of the situation case study (described later), where the problem is to diagnose the underlying issues. These issues are not easy to distinguish because they are submerged in a mass of data, much of which is irrelevant, and because a number of more superficial issues are present as distractions (although the superficial and underlying issues are normally interdependent). The complex case study can be used within a single lesson plan or spread out through a series of lessons within a course. The complex case study is ideal when the trainee is required to sort out and interpret data in order to make a decision.	

Case Study Type: COMPREHENSIVE	Objective Classifications: DIAGNOSIS, DEVELOPMENT, EVALUATION
Description and suggested uses: The comprehensive case study is the most widely used case study. The information used is drawn from real situations and must be well-researched. The primary objective of the comprehensive case study is to help trainees learn for themselves by independent thinking. Comprehensive case studies are best suited for a single lesson plan. They can be written based upon a single situation, or a combination of situations based on the same theme.	

Case Study Type: CRITICAL INCIDENT	Objective Classifications: DIAGNOSIS, EVALUATION
Description and suggested uses: The critical incident case study is sometimes known as a jigsaw case study. Here, the trainee is presented with a small amount of information about a situation. Additional data is supplied by the instructor over time and may take the form of handouts or verbal descriptions. Once all of the data is received, the case situation can be understood, and once understood often leads to suggestions for action. This type of case provides an opportunity to develop the skills of "asking the right questions." This type of case study is appropriate for training facility operators. It would help them develop the diagnostic skills needed for unusual events or emergency situations. The critical incident case study can be presented in the form of an exercise within a lesson plan. A technique for this kind of exercise is to break the trainees into teams. Some of the teams are given the true facts of a situation and should reach similar conclusions. The other teams are given slightly distorted facts that, without careful consideration, can lead to conclusions different from the other teams. This difference will generate discussions that allow the trainees to contrast and compare their conclusions in order to arrive at a consensus.	

Case Study Type: DECISION	Objective Classifications: DEVELOPMENT, EVALUATION, PROMOTION, DEFENSE

Description and suggested uses:
The decision case study can be used as an exercise within a lesson plan, or as an evaluation tool to measure whether the trainees have achieved the objective. This type of case study can be combined with a role play to enhance the learning experience. The decision case study requires the trainee to do more than to acquire and manipulate data or to provide an analysis of a situation. Here, the trainee has to exercise judgment and state what should be done in the circumstances described. This requires the formulation of an action plan.

The decision case study is useful when the instructional developer wants to improve creative thinking, judgment, or attitudes. This is also an excellent method to gauge trainee performance under various situations. It provides a risk-free atmosphere for the trainees to test their actions.

Case Study Type: EXERCISE	Objective Classifications: DIAGNOSIS, DEVELOPMENT, EVALUATION

Description and suggested uses:
This type of case study relates to real-life situations. Similar to the background case study method, the practice of certain techniques, particularly those involving quantitative manipulations (e.g., chemistry dilution or concentration problems, startup rate problems, shielding problems, criticality problems) are made easier if the data is presented in case form. The trainee can see that the manipulation relates to a necessary job skill, rather than being purely an academic exercise. This is important especially when instructing adult learners. This type of case study is equally effective in classroom, laboratory, or on-the-job settings.

Case Study Type: IN-TRAY	Objective Classifications: DIAGNOSIS, DEVELOPMENT, EVALUATION, PROMOTION, DEFENSE
Description and suggested uses: The in-tray case study is a variation of the decision-type case study and consists of a number of documents that managers or supervisors might find in their in-trays. Some background information is provided, and the trainees are allowed a limited time to determine and record their actions on each of the documents provided. This type of case study closely approximates a real-life supervisory function. The in-tray case study is very useful for improving analytical skills, promoting creative thinking, and practicing decision making. For example, it can be used to train on facility policies and for evaluating learning objectives in the affective domain. The in-tray case study can be used as an exercise within a single lesson plan or as a series of exercises throughout a course.	

Case Study Type: LIVE	Objective Classifications: DIAGNOSIS
Description and suggested uses: The live case study is one of the more unique types of case studies in use. The material for a live case study comes from events that are occurring at the present time. Often, nothing more than a newspaper article is used to provide the trainees with the case study information. The instructor provides questions for thought and to prompt a discussion. The answers are truly unknown when this case is presented. Only after a few days can the trainee's conclusions be compared with the actual decisions made. This is usually found in a follow-up newspaper article or industry publication. This type of case study can be used in classes that last several weeks (such as reactor operator qualifications), or for requalification programs. Because the information for a live case study is based on current events, it is difficult to plan for and write into a lesson plan. To use a live case study, give the trainees up-to-date factual information to start with. During the remainder of the class, provide an interim problem-solving exercise. Finally offer opportunities to compare and appraise a variety of solutions for the problem analyzed (i.e., comparing hypothetical solutions worked out in the study group against the actual solutions that have been applied).	

Case Study Type: PARTICIPANT	Objective Classifications: DEVELOPMENT, PROMOTION, DEFENSE
Description and suggested uses: The participant case study is a variation of the conventional case study. The idea is to have the trainees develop and present a case study to the group. The trainees can readily identify with this type of case since it is being conveyed (normally) by one of their peers. The advantages of this approach include greater trainee involvement and interest, cases which are complex and challenging, and increased responsibility by trainees to contribute materials for the learning experience, with a corresponding reduction in the dependency on the trainer who ordinarily “does it all.” A participant case study can promote interaction and teamwork since the cases brought in by the trainees often relate to problems in their work environment or area. This type of case study can be used as a final exercise within a course, where the information has been presented to the trainees over the entire course.	

Case Study Type: ROLE PLAY	Objective Classifications: DIAGNOSIS, DEVELOPMENT, EVALUATION, PROMOTION, DEFENSE
Description and suggested uses: With a role play case study, the trainees participating receive outlines of the roles that they have agreed to assume and are then free to develop the characterization of the roles as they see fit. The roles are written on the basis of actual incidents with the characters being the participants in the incident. A brief summary of the incident is presented by the instructor to “set the scene” before the trainees begin the role play. Role plays usually are not scripted; consequently, the outcome cannot be predetermined. When role playing is used, it generates a near-live case study for subsequent analysis and an opportunity for the players to experience the feelings of being themselves in the case situation, in which they can test the validity of their views. Role playing is an excellent way to teach and evaluate affective learning objectives. Simulator scenarios are a form of role play, because the simulator is set to provide a certain facility condition and the trainees are trained and evaluated on the required responses. Role plays can be combined with other types of case studies to enhance the learning. Role plays can be used anywhere within a lesson plan: as a motivator, as an internal transition, or for evaluation.	

Case Study Type: SEQUENTIAL	Objective Classifications: DIAGNOSIS, DEVELOPMENT, EVALUATION
Description and suggested uses: The technique in this type of case study is to “stop the action” at a critical point in the event so that the trainees can predict outcomes or suggest courses of action. The event is then continued, and an analysis made of the reasons for the differences between the predictions and what actually happened. This technique is an excellent way to improve the trainee's analytical thinking. It can be effectively employed at facilities using simulators. The sequential case study can be combined with other case studies such as an exercise case study or role play for enhanced learning.	

Case Study Type: SITUATION	Objective Classifications: EVALUATION
Description and suggested uses: This case study is similar to the comprehensive case study. This type of case describes events that may be seen either as a success or as a failure. While the issues are usually fairly clear, they are often not those stated by the characters in the case. For example, it could relate a situation where one participant inadvertently discriminates against another participant. This type of case study is excellent for improving analytical thinking. Trainees studying the case learn to critically examine such statements in the light of the other evidence presented. They can also be used as preventive training for negative events (i.e, If personnel are informed of adverse events and understand the causes, they might not make the same mistake themselves). A situation case study can be written anywhere within a lesson plan.	

Case Study Type: INTERACTIVE VIDEO	Objective Classifications: DIAGNOSIS, EVALUATION
Description and suggested uses: Technology has merged the computer with the videodisc to produce a powerful instructional tool. This technology allows the instructional developer to bring simulation into the classroom, providing realistic, hands on training for the trainee. Interactive video can simplify ideas and events so that the trainees “get the message” with relative ease (e.g., this is helpful to those trainees who have difficulty learning the information from reading). For this type of case study, the simulation can be that of a process, system, or component, set up so that events that have occurred in the past can be repeated for the trainees. The trainees interact with the system and respond to the situation presented. This type of case study helps to build diagnostic skills and analytical thinking.	

APPENDIX B

CASE STUDY EXAMPLES
THE COMPREHENSIVE CASE STUDY

The example comprehensive case study that follows was used to train personnel in the commercial nuclear industry. Because of the length of the comprehensive case, trainees may need to spend considerable time (as much as two or three hours) in preparation for the case discussion session. The discussion is very nondirective, with the instructor's role being that of catalyst, encourager, climate-setter, devil's advocate, issue sharpener, referee, etc., rather than that of expert, lecturer, authority figure, and the like. The instructor's technique to start the discussion is often a simple question: “What seems to be going on here?”

The group typically will identify many issues in the case since it is so comprehensive and diverse. A major goal is for the trainees to see the “big picture,” the relationships of events, the internal and external forces at work, the role of personality in decision making, and so forth. Learning takes place largely because of the different views of the group.

A CABLE TRAY FIRE AT A COMMERCIAL NUCLEAR POWER PLANT

This case study covers a cable tray fire at a commercial nuclear power plant. An event description of operator actions necessary to fight the fire and maintain control of the plant is included.

Successfully extinguishing a fire is difficult under ideal conditions; combining fire fighting efforts with a plant shutdown requires forethought and planning.

OVERVIEW

The commercial nuclear power plant experienced a serious inplant cable tray fire. The fire was started by an engineer who was using a candle to check for air leaks through a fire wall penetration seal. The fire spread and was fought on both sides of the reactor building and cable spreading room wall by plant and local community fire fighting personnel. Efforts to put out the fire were made difficult by several factors: delay in notifying personnel of the exact location of the fire, physical location of the fire in the cable trays, and the high differential pressure between the cable spreading room and the reactor building that resulted in high air flow rates through the wall.

The effects of the fire on the plant were almost immediate. All Unit 1 emergency core cooling systems were lost, as well as the capability to monitor core power. To remove decay heat, low pressure water from the condensate pumps and manual operation of primary relief valves were used until normal decay heat removal systems could be made operational. Control power to motor operators and pump controls was established using temporary jumpers allowing the plant to be brought to a stable shutdown condition. There was no release of radioactivity.

DESCRIPTION OF THE EVENT

This commercial nuclear power plant is a three-unit boiling water reactor site. At the time of the event, Units 1 and 2 were in operation at 100% power. Unit 3 was under construction.

Activities Preceding the Fire

The plant is designed so the air movement from one plant area to another is controlled by supply and exhaust fans and will always be toward the area of possible higher radiation. The reactor building and refueling floor is the area of lowest pressure. The standby gas-treatment system must exhaust air from the reactor building to maintain a negative pressure. In order not to exceed the capacity of this system, inleakage to the reactor building must be kept at a minimum.

The refueling floor is common for all three reactor units. To maintain the proper pressure conditions, an airtight partition was constructed between operating Units 1 and 2, and Unit 3, while Unit 3 was under construction. It was necessary to determine that the standby gas-treatment system could handle the added inleakage from the Unit 3 reactor building before the partition between Units 2 and 3 could be removed. Leakage tests run on the Units 1 and 2 reactor buildings indicated that leakage had to be reduced to a maintaining inleakage within the requirements of the Units 1 and 2 technical specifications when the partition was removed.

The program undertaken to reduce leakage required that all leaks be identified and listed, that leaks be sealed, and that work be verified and signed off by an engineer. The method for detecting air leaks was left to the discretion of the engineer in charge. Several methods had been employed including smoke devices, soap solutions, and candles. The movement or flickering of a candle flame was an especially effective method for locating leaks in dimly lighted areas and became the method most used. As the number of leaks was reduced, the differential pressure across the walls increased and penetrations that originally did not leak began to permit leakage. Therefore, the inspectors, accompanied by electricians who sealed leaking penetrations as they were discovered, were instructed to recheck all penetrations in their assigned areas.

Fire in the Cable Spreading Room

Cable penetrations had been sealed after initial installation but additional cables were often added. To make an opening for additional cables, holes were punched through the wall penetration sealing materials and fire stop with a wooden stick. This process resulted in pieces of polyurethane and flameastic (fire retardant material) being knocked onto the cables on both sides of the penetration.

In the early afternoon, an inspector and an electrician were checking cable penetrations through the wall between the cable spreading room and the Unit 1 reactor building. The inspector was using a candle flame to detect air leaks. The inspector detected a strong air leak in the penetration for the second tray from the bottom on the west row. The electrician experienced difficulty reaching the penetration to seal it because it was recessed into the wall farther than he could reach. The inspector volunteered to seal the leak for the electrician. The electrician handed him pieces of resilient polyurethane foam sealing material that the inspector inserted into the hole. After inserting the resilient polyurethane foam into the leak, the inspector placed the candle about 1 inch from the resilient polyurethane foam to check the success of the repaired seal. The airflow through the leak pulled the candle flame into the resilient polyurethane foam, which sizzled and began to burn. The inspector and the electrician attempted unsuccessfully to put out the fire by breaking up and smothering the burning material. Realizing the fire was progressing beyond their ability to control, the electrician called for fire extinguishers. The fire burned for about 1 minute before the first carbon dioxide fire extinguisher arrived. The entire contents of three carbon dioxide extinguishers, two of which were only partially filled, were emptied on the fire without effect because of the air flow across the penetration.

The inspector realized that the fire had spread to the reactor building side of the wall, and two construction workers who were in the area left the spreading room for the reactor building to fight that fire. On their way to the reactor building they informed a public safety officer of the fire in progress in the Unit 1 reactor building. The public safety officer called the control room and reported the fire, 15 minutes after it had started.

As the engineer prepared to discharge a fourth extinguisher, the spreading room carbon dioxide system alarm was sounded and all workers evacuated the spreading room. Twenty minutes after the fire started and after ensuring that no workers were in the spreading room, an assistant shift engineer attempted to initiate the cable spreading room's total flooding carbon dioxide system from outside the cable spreading room, but was unable to do so because it had been deenergized while workmen were in the spreading room. The assistant shift engineer restored the electrical power and initiated the carbon dioxide system. After the carbon dioxide system had been operated, the assistant shift engineer checked the spreading room and found that the fire was still burning because the ventilation system had not been secured.

Organized fire fighting efforts were delayed because the control room did not know the exact location of the fire. An assistant shift engineer located the construction workers fighting the fire in the reactor building and called the control room, while another assistant shift engineer in the reactor building reported the cable spreading room fire to the control room.

Fifty minutes after the start of the fire, fire fighting efforts were underway on both sides of the wall but met with little success in stopping the spread of the fire. The assistant shift engineer in charge in the reactor building called for the assistance of a nearby community fire department. These fire fighting personnel arrived on the scene after the fire had burned for almost an hour and a half. Fire fighting continued in the cable spreading room using portable carbon dioxide and dry chemical extinguishers for almost three hours when a near continuous application of dry chemical and carbon dioxide agents extinguished the cable spreading room fire.

Fire in the Reactor Building

When the two construction workers arrived at the penetration in the reactor building, they discovered the fire had spread into the cable tray system about 20feet above the floor. Their attempts at extinguishing the fire were unsuccessful. When the assistant shift engineer arrived at the scene, he took charge of the fire-fighting efforts and evacuated all construction workers from the reactor building. Heavy smoke reduced area visibility and made the use of breathing apparatus necessary. An hour and ten minutes after the fire started, all ac lighting in the reactor building was lost. Soon after lighting was lost in the reactor building, the decision was made to concentrate on fighting the fire in the cable spreading room. This was necessary because the cable spreading room fire was beginning to affect the operability of plant systems and because the control room was located directly above the cable spreading room.

Consequently, limited fire fighting took place in the reactor building. When the fire in the cable spreading room was extinguished four hours after the start of the fire, the assistant shift engineer, who had been directing activities in the cable spreading room, took charge of fire fighting in the reactor building. Because of limited visibility, wires and ropes were used as guides by fire fighting personnel. Eventually, temporary DC lighting was installed. Teams of two to three people were relayed into the fire area to discharge fire extinguishers and then return. Water was not used as an extinguishing agent until later that evening, seven hours after the fire started. After water was continuously applied for 10 minutes, the fire in the reactor building was extinguished. Water was initially not used to fight the fires because plant personnel were concerned about the effects of grounds and shorts on plant operation and also the potential personnel hazards associated with fighting fire in electrical cabling with water.

Effects on Plant Operation

The first indication of the fire's effect on Unit 1 operation came 20 minutes after the fire started with the almost simultaneous annunciation of several alarms:

“RESIDUAL HEAT REMOVAL OR CORE SPRAY AUTOMATIC BLOWDOWN PERMISSIVE,” “REACTOR WATER LEVEL LOW-AUTOMATIC BLOWDOWN,” and “CORE COOLING SYSTEM/DIESEL INITIATE.”

The control room operators observed that normal conditions of reactor water level, reactor steam pressure, and drywell atmosphere pressure existed, so they were confused by the alarms. Over the next 8 minutes, several events occurred, including the automatic starting of residual heat removal and core spray pumps, the high-pressure coolant-injection pump, and the reactor core isolation coolant pump. In addition, control board indicating lights were randomly glowing brightly, dimming, and going out; numerous alarms occurred; and smoke came from beneath Panel 9-3, which is the control panel for emergency core cooling systems. The operators shut down equipment that was not needed, such as the residual heat removal and core spray pumps, only to have them restart again automatically.

When reactor power was affected by an unexplained runback of the reactor recirculating pumps, the shift engineer instructed the operator to reduce recirculating pump loading and scram the reactor. While this was being done, the recirculating pumps tripped off. The reactor was scrammed by the operator 30 minutes after the fire started.

Operators confirmed that the reactor control rods were fully inserted. Thirty-five minutes after the fire started the turbine-generator was manually tripped. One minute later, all capability to monitor core power was lost as the vital power supply electrical boards were lost. In addition, all emergency core cooling systems were lost because their motor-operated valves lost power and could not be operated remotely. All of the outboard main steam isolation valves shut, isolating one main condenser as a heat sink. Because reactor pressure increased rapidly to 1100 psig, the control room operators took manual control of the main steam relief valves to reduce pressure by cycling pressure between 850 and 1080 psig.

Owing to the almost constant blowdown of reactor pressure that added heat to the suppression pool, suppression pool cooling became essential 40 minutes after the fire started, but the residual heat removal system, which is normally used, was unavailable because of the electrical board losses.

The next 30 minutes were spent trying to get the shutdown buses powered either by the running diesel generators or from Unit 2. During this period, the reactor water level dropped from its normal 201 inches to 48 inches above the top of the active fuel. To recover water level, water was added to the reactor through the feedwater bypass valve from the condensate booster pump. Water level went too high because control of the bypass valve had been lost, so an auxiliary unit operator was sent to manually throttle the valve.

Nearly four hours after the fire started, four auxiliary unit operators working in pairs were successful in isolating faulted residual heat removal circuits to get the residual heat removal system aligned. The residual heat removal system was not started until early the next morning, 13 hours after the fire started, because it could not be confirmed that the system was filled with water.

Sixteen hours after the fire started, shutdown cooling had been established, suppression pool cooling continued, and essential plant instrumentation had been restored. Nearly all of these activities were accomplished as a result of operator actions locally.

Temporary power supplies, manual valve operation, and use of temporary procedures were typical conditions because of the fire damage. The effects on Unit 2 were less severe; however, the reactor depressurized because of a suspected stuck-open relief valve and some vessel level instrumentation was lost. Unit 2 reactor was placed in shutdown cooling about 11 hours after the fire started.

Lessons Learned

The inability to put out the fire was caused, in part, by the large air flow through the penetration that prevented the carbon dioxide and dry chemicals from smothering the fire. Compounding this were the fire fighters' difficulty in seeing exactly what was burning and working in the confined spaces, which made access to the affected areas difficult.

The use of water at an early stage would have extinguished this fire and prevented the loss of circuits not already affected. Although the suggestion to use water was made repeatedly by the local community fire chief, plant personnel were concerned about the effects of grounds and shorts on plant operation and potential personnel hazards.

Community fire fighting personnel did not arrive at the scene until approximately 45 minutes after they were called. Part of the delay was the need to process temporary radiation monitoring badges.

The community fire department special water hose nozzle for electrical fires was not compatible with the plant's hose.

A fire watch, who normally has no other duties but to watch for potential fires, had not been assigned.

QUESTIONS

C What steps are taken at your facility to ensure the ability to operate equipment and valves locally?

C How are the operators at your facility made knowledgeable of alternate equipment power supplies and system cross-connect capabilities?

C How are the quantity and location of breathing air packs at your facility determined?

C What are the immediate individual responses to a fire for the following personnel?
- Person discovering the casualty
- Shift supervisor
- Reactor operator
- Shift technical advisor
- Fire brigade leader
- Fire brigade team member.

C What sources of emergency lighting and ventilation are available for use at the scene of a fire? Where are they located?

C How are the following casualty response elements coordinated with the surrounding communities?
- Knowledge of response capabilities
- Compatibility of equipment
- Provisions for rapid facility access
- Definition of roles and responsibilities

C What additional steps need to be taken at your facility to enhance the operator's ability to deal with this or a similar casualty?

FACILITY ACTIONS

Maintain high standards of housekeeping and cleanliness.

Obtain the proper permits for cutting, welding, or flame producing operations.

Stationing fire watches during spark or flame producing activities.

Promptly notify the control room of casualty conditions and location.

APPENDIX B

THE BACKGROUND CASE STUDY

The background case study is ideal for use within a lesson plan as a motivator, as an introduction to a new objective or lesson topic, or as a means for measuring trainee comprehension of the lesson material. The case study is presented to the trainees by the instructor and then discussed. After the discussion, a handout similar to the one beginning on page B-15 can be distributed to the trainees as reinforcement of the case studies lessons learned.

APPENDIX B

A CABLE TRAY FIRE AT A COMMERCIAL NUCLEAR POWER PLANT

A commercial nuclear power plant experienced a serious inplant cable tray fire. The fire was started by an engineer who was using a candle to check for air leaks through a fire wall penetration seal. The fire spread and was fought on both sides of the reactor building and cable spreading room wall by plant and local community fire fighting personnel. Efforts to put out the fire were made difficult by several factors: delay in notifying personnel of the exact location of the fire, physical location of the fire in the cable trays, and the high differential pressure between the cable spreading room and the reactor building that resulted in high air flow rates through the wall.

The effects of the fire on the plant were almost immediate. All Unit 1 emergency core cooling systems were lost, as well as the capability to monitor core power. To remove decay heat, low pressure water from the condensate pumps and manual operation of primary relief valves were used until normal decay heat removal systems could be made operational. Control power to motor operators and pump controls was established using temporary jumpers allowing the plant to be brought to a stable shutdown condition. There was no release of radioactivity.

A. Lessons Learned

- C The inability to put out the fire was caused, in part, by the large air flow through the penetration that prevented the carbon dioxide and dry chemicals from smothering the fire. Compounding this were the fire fighters' difficulty in seeing exactly what was burning and working in the confined spaces, which made access to the affected areas difficult.

- C The use of water at an early stage would have extinguished this fire and prevented the loss of circuits not already affected. Although the suggestion to use water was made repeatedly by the local community fire chief, plant personnel were concerned about the effects of grounds and shorts on plant operation and potential personnel hazards.

- C Community fire fighting personnel did not arrive at the scene until approximately 45 minutes after they were called. Part of the delay was the need to process temporary radiation monitoring badges.

- C The community fire department special water hose nozzle for electrical fires was not compatible with the plant's hose.

- C A fire watch, who normally has no other duties but to watch for potential fires, had not been assigned.

B. Questions and answers

1. What are the immediate individual responses to a fire for the following personnel?

   Person discovering the casualty. *Report it to the Control Room at ________.*

   Shift Supervisor. *Notify all facility personnel, the fire department, and security.*

   Reactor Operator. *If necessary, scram the reactor. Carry out the directions of the control room supervisor.*

   Shift Technical Advisor. *Monitor the situation and advise the control room supervisor as necessary.*

   Fire Brigade Leader. *Report to the equipment locker and assemble fire party. Coordinate fire fighting efforts. Keep the control room informed.*

   Fire Brigade Team Member. *Report to the equipment locker and proceed as directed by the fire brigade leader.*

2. How are the following casualty response elements coordinated with the surrounding communities?

   Knowledge of response capabilities. *Contained in the Fire and Safety Manual.*

   Compatibility of equipment. *Contained in the Fire and Safety Manual.*

   Provisions for rapid facility access. *Contained in the Facility Security Manual.*

   Definition of roles and responsibilities. *Contained in the Fire and Safety Manual and stated in the letter of agreement with the State Department of Public Safety.*

3. What additional steps need to be taken at your facility to enhance the operators' ability to deal with this or a similar casualty? (List your ideas.)

C. Actions to take to minimize the effects of this kind of event at the facility

1. Maintain high standards of housekeeping and cleanliness

2. Obtain the proper permits for cutting, welding, or flame producing operations

3. Stationing fire watches during spark or flame producing activities

4. Promptly notify the control room of casualty conditions and location.